Maas
AHT-28-V/AHT-78-U
Handheld Transceivers
User's Manual

Thank you very much for using our two way radio. This radio of modern design is reasonable structure with stable functions. It is designed to meet different customers' need for high quality with easy operation and perfect capablity. We believe you are pleased with its nice shape and excellent performance.

This manual is suitable for using the model of **maas** AHT-28-V/AHT-78-U.

Welcome to use **maas** two-way radio

www.maas-elektronik.com

Main Functions

Single band, dual display, dual standby

A/B band independent operation

2x128 channels storage and scanning

FM radio and 25 stations memory

Wide/Narrow band selectable

VOX 0~9 grade setting

Chinese/English voice prompt

CTCSS/DCS and scanning

1750Hz tone

ANI function

Shortcut menu operation mode

Emergency alert

DTMF and remote stun/kill/activate (optional)

8 groups of scrambler, 2/5 tone, remote stun/

kill/activate (optional)

www.maas-elektronik.com

CONTENTS

USING TIPS

UNPACKING AND CHECKING EQUIPMENT

USING TIPS

Please read the following brief instructions, non-compliance with these rules may cause danger or violate the law.

- Obey the local government regulation before using this radio, improper use may violate the law and be punished.
- Turn off the radio before entering flammable or explosive areas.
- Do not charge or change the battery in flammable or explosive areas.
- Turn off the radio before getting close to the blasting zone or detonator areas.
- Do not use radio whose antenna is damaged, touching of damaged antenna will cause heat injury.
- Do not attempt to open the radio; the maintenance work should be done by technical expert only.
- To avoid troubles caused by electromagnetic interference or electromagnetic compatibility, please turn off the radio in places where have the banner "Do not use wireless equipment", such as hospital and other healthcare places.
- In the car with an airbag, do not put the radio within the scope of the airbag deployment.
- Do not store the radio under the direct sunshine or in hot areas.
- When you transmit with the radio, do keep away from its antenna for 5cm at least.
- If the radio appears smelly or smoke, please shut off its power immediately and contact with your local dealer.
- Do not transmit too long, for the radio may heat and hurt the user.

UNPACKING AND CHECKING EQUIPMENT

Welcome to use **maas** AHT-28-V/AHT-78-U. Please check if any damage to the package when your receive it. Carefully unpack the transceiver. We recommend that you check the items listed in the following table. If any items are missing or damaged during shipment, please contact with your local dealer immediately.

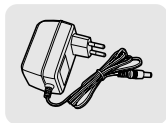Supplied Items:
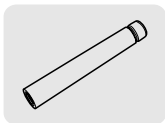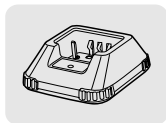

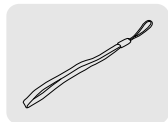Transceiver (1)   Antenna (1)   Li-ion battery (1)   Power Adapter (1)   Charger (1)

Handstrap (1)   Belt Clip (1)   Verification (1)   User's Manual (1)

Note: The antenna frequency range please refers to the annular label at the bottom of antenna.

CHARGING BATTERY PACK
INSTALLATION OF ACCESSORIES

CHARGING BATTERY PACK

Charging Precaution

The supplied battery pack is a high-performance Li-ion battery with 7.4V standard voltage,1600mAh high capacity in a very compact package. Under normal use, the battery pack may be used for approximately 500 charge cycles and more, after which operating time maybe expected to decrease. If you have an old battery pack which is displaying capacity which has become diminished, you should replace the pack with a new one.

Please use **maas** designated battery; other batteries can cause explosion and hurt people.

Notice: ◗ Please do not short-circuit the battery terminals or expose of in fire. Do not disassemble the battery unauthorized.

◗ Charge the battery between temperature 0℃ and 45℃. The battery can not be normally charged beyond this temperature range.

◗ Please turn off the transceiver when you charge it. Transmitting with the transceiver in charge will affect its normal charge.

◗ Do not unplug the Power Adapter or battery when it is charged.

◗ If the battery pack lasts shortly even it is full of power, it shows that the battery is depleted, please change the battery pack.

◗ Please do not charge when the battery or the radio is wet. Please dry it with a cloth before charging to avoid any danger.

Warning: When the conductive metals such as jewelery, key or decorative chains touch the

battery terminals, all the batteries are likely to cause damage to the items or personal injury. These conductive metals may form a short circuit and generates much heat. Do deal with any battery carefully, especially when put it into pocket, wallet or other metallic containers.

Charging Operation

After installing the battery pack, if the battery icon shows ⊏⊐, it means that the battery pack is out of power, Please charge it.

Indicator light of charger will show charging condition

| Indicator Display	Status
Red	Charging
Green	Completed

Battery Tips:
- The battery is not fully charged in factory, please charge before using it.
- Charge and discharge the battery for two or three times, the battery capacity will reach the best condition. When the battery capacity is low, please charge or change the battery.
- The battery lasts shortly even if it is fully charged, the battery is depleted, please contact your local dealer to buy a new authentic battery.
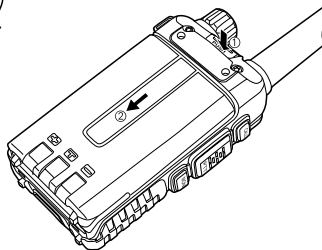
INSTALLATION OF ACCESSORIES

Installation of Battery Pack

1) Fit the supplied battery pack into the batter pack trough, then slide it toward the head to insert it completely---in direction of arrowhead (Picture 1).

2) Push the battery pack lock to release the battery pack and slide it toward the bottom to remove it out---in direction of arrowhead (Picture 2).
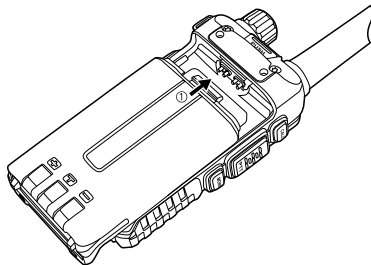
Picture 1   Picture 2

Antenna Installation

The supplied antenna provides good results over VHF or UHF range of the transceiver you need. However, for enhanced base station medium-wave and shortwave reception, you may wish to connect an external antenna, as the supplied antenna is very small and can't be expected to provide high performance at these frequencies.

The antenna has 4 different frequency bands.

To install the supplied antenna, hold the bottom end of the antenna, then screw it onto the connector on the transceiver until it is snug.

Do not over-tighten by use of extreme force.

Picture 3

To uninstall the antenna, hold the bottom end of it and turn it counterclockwise to remove it.

Picture 4

Notes: ■ Never transmit without having an antenna connected.

■ When installing the supplied antenna, never hold the upper part of the antenna while screwing it onto the connector on the transceiver. Or you may snap the antenna.
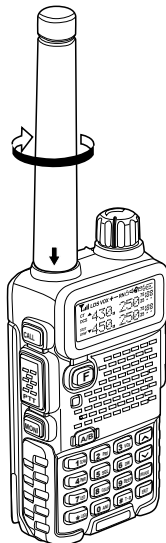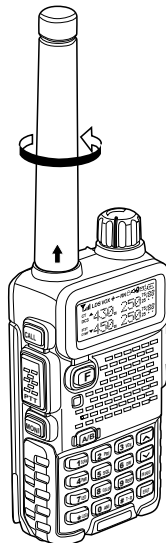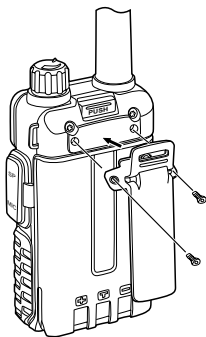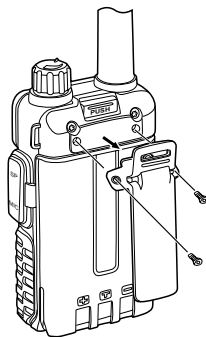
Picture 3   Picture 4

Installing Belt Clip

Align the two holds of belt clip and the two holes of the radios, fix them with the supplied M2.5x5 screws. Loosen the screw set to remove belt clip.

Picture 5, Picture 6

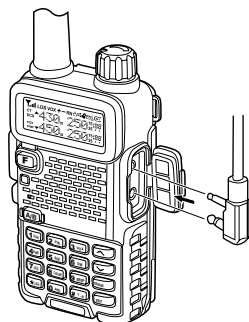Picture 5   Picture 6

Installing External Micro/Speaker

Open the cover of the Mic/speaker jack and insert
the microphone/speaker plugs into the jack. Picture 7

Note: ■ Using the external headset or Mic/speaker
will affect the water-tightness performance
of radio.

■ If the external headset is not workable, please
use the headset case.

Picture 7

Wrist Strap Installation

Wear strap through the hole on the back of radio.

Picture 8
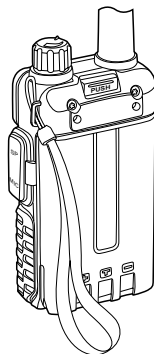
Picture 8

GETTING FAMILIAR

RADIO ILLUSTRATION

POWER/VOLUME DIAL
This control toggle the transceiver's power on/off and adjust the audio volume level.

ANTENNA
Connect the supplied antenna here.

BUSY/TX
The indicator turns green during receive and turns red during transmit/ emergency alarm.

SPEAKER
The internal speaker is located here.

MIC
The internal microphone is located here.

KEYBOARD
These 18 keys select the operating features on the transceiver. The function of the keys are described in details on pgs. 16&17.

CALL
Activates T-CALL (1750Hz) for repeater access and transmit DTMF and 2/5 tone signaling.

PTT
Press it to transmit and release it to receive after your transmission is completed.

MONI
Press this key disables the noise squelching action, allowing you to hear very weak signals near the back-ground noise level.
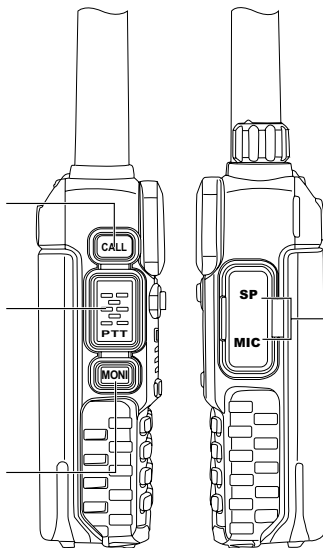
MIC/SP
The jack provides connection points for microphone audio, earphone audio, speaker and program cable.

LCD DISPLAY

You will see various icons shown on the screen when power on. The following table can help you identify icons' meaning which display on LCD.
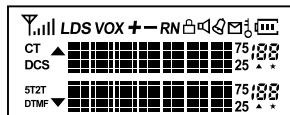
Icons	Description of functions
▼.ıll	Operating band signal & power meter
L	Low TX power active
D	Dual watch/standby active
S	RX power save active
VOX	VOX active
+−	Repeater shift direction
R	Reverses the transmit and receive frequency active
N	Narrow band mode active
🔒	Keypad lock active

Icons	Description of functions
⊄	Squelch active
⊲	Beep tone active
✉	Receive calling ID or MSG
¹₀	Scrambler active
⊞	Battery power indicator
CT	CTCSS decoder active
DCS	DCS decoder active
5T	5 Tone signaling active
2T	2 Tone signaling active
DTMF	DTMF signaling active
▲	Operating A band indicator
▼	Operating B band indicator
75 25	Frequency mantissa indicator
188	Channel number/Menu items number indicator
▲	Busy channel indicator
★	Channel scanned available under CH mode

KEYPAD FUNCTIONS

	[F]	[A/B]	[⌃]	[⌄]	[EXIT]
Press key	Enter menu mode/confirm the setting	Switch the A or B frequency to be the "Operating" Band	Upper menu item, channel or frequency	Lower menu item, channel or frequency	Switch VFO mode and MR mode/exit the setting
Press and turn on the radio	Enter reset mode	No action	Switch CH mode and VFO mode	No action	No action

	[1 SCAN]	[2 PRI]	[3 VOX]	[4 PWR]	[5 SQL]
Press key	Frequency/ Channel No. entry "1"	Frequency/ Channel No. entry "2"	Frequency/ Channel No. entry "3"	Frequency/ Channel No. entry "4"	Frequency/ Channel No. entry "5"
Press [F] +	Enter scan item	Enter priority TX mode item	Enter VOX level item	Enter high/low power item	Enter squelch level item

	[**6** DW]	[**7** LED]	[**8** COLOR]	[**9** BEEP]	[**0** ANI]
Press key	Frequency/ Channel No. entry "6"	Frequency/ Channel No. entry "7"	Frequency/ Channel No. entry "8"	Frequency/ Channel No. entry "9"	Frequency/ Channel No. entry "0"
Press [**F**] +	Enter dual wait/standby item	Enter LED item	Enter color item	Enter beep item	Enter ANI item
	[**＊** LOCK]	[**#** T-R]	[**FM RADIO**]		
Press key	Left cursor position when editing channel name	Right cursor position when editing channel name	Enter or exit FM radio mode		
	Press and hold key to start keypad lock.	Press and hold key to start reverse frequency	Press [**F**] + [**FM RADIO**] to start emergency alert		

User's Manual

MODEL VERSION
WORKING MODE
SET MENU MODE
SHORTCUT MENU OPERATION

MODEL VERSION

The AHT-28-V/AHT-78-U has 3 versions in total:

1) Simple version   2) DTMF version   3) 5T&2T version

Set Menu 20th Power-on Display OFF, you will find your AHT-28-V/AHT-78-U model version information when you switch the transceiver power on.

DTMF and 2/5 TONE version will be with remote kill/stun/activate/revive function.

Only 2/5 TONE version will be with 8 groups of scrambler function.

Please choose the right AHT-28-V/AHT-78-U model type when you use software to program it. If not, it will affect some functions operation. Detail please see picture as below:

WORKING MODE

1) Frequency Mode (VFO)

Under this mode, you can use [▲] / [▼] key to change the frequency or input the frequency by keypad directly and store channels.

2) Frequency-Channel Mode (MR)

When you have stored a memory channel at least and under VFO mode, press [EXIT] key to enter MR mode.

The frequency will be indicated on the display and the channel No. will be indicated at the right side. If the transceiver display name option is ON and channel name edited, it will show the name of the channel.

Please see Shortcut Menu Operation Item 23&24. Page 37.

3) Channel Mode (CH)

When you have stored a memory channel at least, press [▲] key and switch power on the radio, enter CH mode. Channel No. will be indicated on the display and if the transceiver display mode option is ON, it will show the name of the channel.

Please see Shortcut Menu Operation Item 23&24. Page 37.

4) FM Radio Mode

The transceiver provides frequency 70.00-108.00MHz FM radio.

Under this mode, you can choose FM frequency you need directly. Scan frequency range and store your favorite channels. Press [FM RADIO] to enter and exit FM radio mode.

5) MENU Mode

Press [**F**] key to enter MENU mode, there are 34 items in total. Please see SET MENU MODE. Page 22

6) Reset Mode

Press [**F**] key and switch the power on to enter Reset mode, then press [**F**] key to enter.

1. [**∧**] or [**∨**] key to select VFO/FULL.

2. VFO: initialize all setting under frequency mode.

3. FULL: initialize all setting under frequency and memory mode.

SET MENU MODE

No.	LCD Display	Available Values	Description of Function
01	SCAN	/	Frequency/Channel Scan
02	TX.SEL	EDIT / BUSY	Priority Transmit
03	VOX	1-8	VOX Level Setting
04	POWER	LOW / HIGH	High/Low TX Power
05	SQL	0-9	SQL level setting
06	D.WAIT	ON / OFF	Dual Wait/Standby
07	LED	ON / AUTO / OFF	LED Display mode
08	LIGHT	COLOR1 / COLOR2 / COLOR3	Background Light Color
09	BEEP	ON / OFF	Keypad Beeper Setting
10	ANI	ON / OFF	Automatic Number Identity
11	TOT	OFF / 30 / 60 / ... / 270	Transmitter Time-Out Timer
12	BCLO	OFF / WAVE / CALL	Busy Channel Lock-Out
13	VOX.SW	ON / OFF	VOX Switch ON/OFF
14	ROGER	ON / OFF	Transmit Over Beeper
15	DW	ON / OFF	Dual Watch/Monitor

No.	LCD Display	Available Values	Description of Function
16	RX.SAV	ON / OFF	Receive Saver
17	SCAN.S	TO / CO / SE	Scan Mode
18	AUTOLK	ON / OFF	Auto Keypad Lock
19	VOICE	ON / OFF	Voice Prompt
20	OPNSET	OFF / DC / MSG	Power-on Display
21	DC	/	Battery Power Voltage
22	MSGSET	-1A, @	Power-on Message
23A	OFFSET	0.000-99.995MHz	Repeater Shift (Under VFO mode)
23B	DIS.NM	ON/OFF	Display Channel Name
24	CHNAME	-1A, @	Channel Name Editing
25	C-CDC	OFF / 67.0 / D023N	TX/RX Tone coder
26	R-CDC	OFF / 67.0 / D023N	RX Tone coder
27	T-CDC	OFF / 67.0 / D023N	TX Tone coder
28	S-D	+ / - / OFF	Shift Direction
29	STEP	5K / 6.25K / ... / 25K	VFO Step
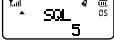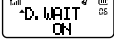
No.	LCD Display	Available Values	Description of Function
30	N/W	WIDE/NARROW	Wide/Narrow Band
31	SEEK 67.0	/	CTCSS Scanning
32	SEEK D023N	/	DCS Scanning
33	SCR.NO	1-8	Voice Scrambler (Only for 5T&2T version)
34	APRO	OFF / COMP / SCRA	Voice Mode (Only for 5T&2T version)
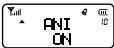
Menu Operation

1) Under standby mode, press [**F**] to enter menu setting, LCD displays "**MENU**".

2) Press [▲] or [▼] to select the desired menu item, LCD display current setting of selected item.

3) Press [**F**] to enter and then press [▲] or [▼] to select the desired setting.

4) Press [**F**] to confirm.

5) Press [EXIT] twice to exit and then return the standby mode.

SHORTCUT MENU OPERATION

Item No.	Item Name	Enter item	Screen Display	Select parameter	Parameter Explanation	Confirm	Return Standby
1)	Frequency /Channel scan	F + 1 scan	SCAN	Press [▲] or [▼] to change scan direction	Press [F] key to start scanning	F	EXIT
2)	Priority Transmit	F + 2 pri	TX. SEL EDIT	Press [▲] or [▼] to select available values	EDIT / BUSY	F	EXIT
3)	VOX level setting	F + 3 vox	VOX 4	Press [▲] or [▼] to select available values	VOX level: 1~8	F	EXIT
4)	TX power setting	F + 4 pwr	POW LOW	Press [▲] or [▼] to select available values	High / Low	F	EXIT
5)	SQL level setting	F + 5 sql	SQL 5	Press [▲] or [▼] to select available values	SQL level: 0~9	F	EXIT
6)	Dual wait/ standby	F + 6 dw	D.WAIT ON	Press [▲] or [▼] to select available values	ON / OFF	F	EXIT
7)	LED display mode	F + 7 led	LED AUTO	Press [▲] or [▼] to select available values	ON / AUTO / OFF	F	EXIT
8)	Background light color	F + 8 color	LIGHT COLOR1	Press [▲] or [▼] to select available values	COLOR1 / COLOR2 / COLOR3	F	EXIT
9)	Keypad beeper	F + 9 beep	BEEP ON	Press [▲] or [▼] to select available values	ON / OFF	F	EXIT

Item No.	Item Name	Enter item	Screen Display	Select parameter	Parameter Explanation	Confirm	Return Standby
10)	Automatic Number Identity	**F** + **0 AM**	ANI ON	Press [▲] or [▼] to select available values	ON / OFF	**F**	**EXIT**
11)	Transmitter time-out timer	**F** + **1 SCAN** **1 SCAN**	TOT OFF	Press [▲] or [▼] to select available values	OFF / 30... / 270s	**F**	**EXIT**
12)	Busy channel lock-out	**F** + **1 SCAN** **2 PRI**	BCLO OFF	Press [▲] or [▼] to select available values	OFF / WAVE / CALL	**F**	**EXIT**
13)	VOX switch	**F** + **1 SCAN** **3 VOX**	VOX SW OFF	Press [▲] or [▼] to select available values	ON / OFF	**F**	**EXIT**
14)	Transmit over beeper	**F** + **1 SCAN** **4 PWR**	ROGER OFF	Press [▲] or [▼] to select available values	ON / OFF	**F**	**EXIT**
15)	Dual watch/ monitor	**F** + **1 SCAN** **5 SQL**	DW OFF	Press [▲] or [▼] to select available values	ON / OFF	**F**	**EXIT**
16)	Receive saver	**F** + **1 SCAN** **6 DW**	RX SAV ON	Press [▲] or [▼] to select available values	ON / OFF	**F**	**EXIT**
17)	Scan mode	**F** + **1 SCAN** **7 LED**	SCANS CO	Press [▲] or [▼] to select available values	TO / CO / SE	**F**	**EXIT**
18)	Auto keypad lock	**F** + **1 SCAN** **8 COLR**	AUTOLK OFF	Press [▲] or [▼] to select available values	ON / OFF	**F**	**EXIT**

Item No.	Item Name	Enter item	Screen Display	Select parameter	Parameter Explanation	Confirm	Return Standby
19)	Voice prompt	☞ **F** + **1** SCAN **9** BEEP	➡ VOICE ON	➡ **F** ➡ Press [▲] or [▼] to select available values	ON / OFF	➡ **F**	➡ EXIT
20)	Power-on display	☞ **F** + **2** PRI **0** AM	➡ •OPN.SET OFF	➡ **F** ➡ Press [▲] or [▼] to select available values	OFF / DC / MSG	➡ **F**	➡ EXIT
21)	Battery power voltage	☞ **F** + **2** PRI **1** SCAN	➡ VLT 7.6V	➡ **F** ➡ Press [▲] or [▼] to select available values	Show current voltage	➡ **F**	➡ EXIT
22)	Power-on message	☞ **F** + **2** PRI **2** PRI	➡ •PON.MSG	➡ **F** ➡ Press [▲] or [▼] to select available values	Edit power-on message	➡ **F**	➡ EXIT
23)	A. Repeater shift	☞ **F** + **2** PRI **3** VOX	➡ •OFFSET 2.000	➡ **F** ➡ Press [▲] or [▼] to select available values	0.000-99.995MHz	➡ **F**	➡ EXIT
	B. Display channel name	☞ **F** + **2** PRI **3** VOX	➡ •DIS.NM ON	➡ **F** ➡ Press [▲] or [▼] to select available values	ON / OFF	➡ **F**	➡ EXIT
24)	Channel name editing	☞ **F** + **2** PRI **4** PWR	➡ •CH.NAME	➡ **F** ➡ Press [▲] or [▼] to select available values	Input channel name	➡ **F**	➡ EXIT
25)	TX/RX tone coder	☞ **F** + **2** PRI **5** SQL	➡ C-CDC 254.1	➡ **F** ➡ Press [▲] or [▼] to select available values	OFF / QT / DCS	➡ **F**	➡ EXIT

Item No.	Item Name	Enter item	Screen Display	Select parameter	Parameter Explanation	Confirm	Return Standby
26)	RX tone coder	**F** + **2 PRI** **6 DW**	R-CDC 254.1	Press [▲] or [▼] to select available values	OFF / QT / DCS	**F**	**EXIT**
27)	TX tone coder	**F** + **2 PRI** **7 LED**	T-CDC 254.1	Press [▲] or [▼] to select available values	OFF / QT / DCS	**F**	**EXIT**
28)	Shift direction	**F** + **2 PRI** **8 COLOR**	S-D OFF	Press [▲] or [▼] to select available values	+ / -	**F**	**EXIT**
29)	VFO step	**F** + **2 PRI** **9 BEEP**	STEP 25K	Press [▲] or [▼] to select available values	5K / 6.25K / 10K...100K	**F**	**EXIT**
30)	Wide/ Narrow band	**F** + **3 VOX** **0 AM**	N/W WIDE	Press [▲] or [▼] to select available values	Wide/Narrow	**F**	**EXIT**
31)	CTCSS scan	**F** + **3 VOX** **1 SCAN**	SEEK 67.0	Press [▲] or [▼] to change scan direction	Press [**F**] key to start scan	**F**	**EXIT**
32)	DCS scan	**F** + **3 VOX** **2 PRI**	SEEK D023N	Press [▲] or [▼] to change scan direction	Press [**F**] key to start scan	**F**	**EXIT**
33)	Voice scrambler	**F** + **3 VOX** **3 VOX**	SCR.No 7	Press [▲] or [▼] to select available values	1~8	**F**	**EXIT**
34)	Voice mode	**F** + **3 VOX** **4 PWR**	APRO OFF	Press [▲] or [▼] to select available values	OFF / COMP / SCRA	**F**	**EXIT**

DETAILED FUNCTION DESCRIPTIONS
ADVANCED FUNCTIONS

DETAILED FUNCTION DESCRIPTIONS

1) Scan & Scan Mode setting (SCAN&SCANS---MENU 1&17)

Functions: under VFO/MR/CH mode, the transceiver allows you to scan the entire
current operating band and memory channels.

Enter Menu 1ˢᵗ and press [F] key to start scanning.

When you have started scanning, press [⌃] / [⌄] key to change direction. And it
will halt on a signal it encounters, press **PTT** key to stop scanning; Press **MONI** key to
stop scanning temporarily; Press [F] key again to exit the scanning function.

Scanning operation is basically the same in each of the above modes. Before you begin,
take a moment to select the way in which you would like the scanner to halt on a signal.

Enter Menu 17ᵗʰ to set scan mode. Default: TO.

Three options for the scan mode are available under VFO mode:

TO: In this mode, the scanner will halt on a signal it encounters, and will hold there for
some time. If you do not take action to disable the scanner within the time period,
the scanner will resume even if the stations are still active.

CO: In this mode, the scanner will halt on a signal it encounters, and will hold there if
the stations are still active. And after the carrier has dropped, the scanner will
resume.

SE: In this mode, the scanner will halt on a signal it encounter, it will not restart
automatically; you must manually re-initiate scanning if you wish to resume.

2) Priority Transmit (TX.SEL---MENU 2)

Functions: The AHT-28-V/AHT-78-U allows you to transmit on the sub band even if you are working on the operating band.

Enter Menu 2nd to select priority transmit band. Default: EDIT.

EDIT: It will transmit on the operating band.

BUSY: It will transmit on the band last talking used.

3) VOX Level & VOX Switch (VOX&VOX.SW---MENU 3&13)

Functions: the VOX function provides automatic transmit/receive switching based on voice input to the microphone. With the VOX switch ON, you do not need to press **PTT** switch in order to transmit, and it is not necessary to use a VOX headset in order to utilize VOX operation.

Enter Menu 13th to set VOX switch. Default: OFF.

When the VOX is activated, the "VOX" icon will appear on the display.

Enter Menu 3rd to set VOX level. It has 8 grades.

The higher level is, the more sensitive will be.

The AHT-28-V/AHT-78-U provides for adjustment of "Hang-Time" of the VOX (the transmit-receive delay after the cessation of speech) via program software.

Default: 2s.

4) TX Power setting (POW---MENU 4)

Functions: you can select high/low TX power according to your talking environment and need. When you store memories, you can store High and Low power settings separately in each memory.

Enter Menu 4th to set TX power.

High: 4W

Low: 0.5W, when you select Low power, the "L'' icon will appear on the display.

5) Squelch Adjustment (SQL---MENU 5)

Functions: The AHT-28-V/AHT-78-U-Squelch system allows you to mute the background noise when no signal is being received. Not only does the Squelch system "standby" operation more pleasant, it also significantly reduces battery current consumption.

Enter Menu 5th to set SQL level. Default: 5.

6) Dual Wait/Standby (D.WAIT---MENU 6)

Functions: The AHT-28-V/AHT-78-U allows you to receive the sub band signal even if you are working on the operating band. It could monitor the signal under both master and sub band at the same time.

Enter Menu 6th to set Dual Wait. Default: ON.

7) LED Display Mode (LED---MENU 7)

Function: select the LED/Keypad Lamp mode.

Enter Menu 7ᵗʰ to select LED display mode. Default: AUTO.

ON: LED display lights all the time.

AUTO: Illuminates the LED when any key is pressed and after 3s the light is off.

OFF: Disable the LED lamp.

8) Background Light Color (LIGHT---MENU 8)

Functions: choose LED background light color.

Enter Menu 8ᵗʰ to select background light color. Default: COLOR1.

COLOR1: Purple.

COLOR2: Blue.

COLOR3: Orange.

9) Keypad Beeper setting (BEEP---MENU 9)

Functions: enable/disable the keypad beeper.

Enter Menu 9ᵗʰ to set keypad beeper. Default: ON.

10) Automatic Number Identity (ANI---MENU 10)

Functions: sending ID code when the transceiver transmits, the others can receive it directly on the display if they also have ANI function.

Enter Menu 10ᵗʰ to set ANI. Default: OFF.

11) Transmitter Time-Out Timer (TOT---MENU 11)

Functions: the TOT feature provides a safety switch which limits transmission to a pre-programmed value. This will promote battery conservation by not allowing you to make excessively-long transmissions, and in the event of a stuck PTT switch it can prevent interference to other users as well as battery depletion.

Enter Menu 11th to set TOT. Default: OFF.

12) Busy Channel Lock-Out (BCLO---MENU 12)

Functions: the BCLO feature prevents the radio's transmitter from being activated if a signal strong enough to break through the "noise" squelch is present. On a frequency where stations using different CTCSS or DCS codes may be active, BCLO prevents you from disrupting their communications accidentally (because your radio may be muted by its own tone decoder).

Enter Menu 12th to set BCLO. Default: OFF.

OFF: Disable BCLO feature.

WAVE: the radio's PTT will be prevented only if the frequency is busy used.

CALL: the radio's PTT will be prevented only the frequency and tone coder is the same.

13) Transmit Over Beeper (ROGER---MENU 14)

Functions: sending a beeper to inform the receiver TX is over.

Enter Menu 14th to set ROGER. Default: OFF.

14) Dual Watch/Monitor (DW---MENU 15)

Functions: Dual Watch feature makes the transceiver can monitor the calling signal when FM radio is on and you won't miss any calling.

Enter Menu 15th to set DW. Default: OFF.

15) Receive Saver (RX.SAV---MENU 16)

Functions: this feature significantly reduces quiescent battery drain, and you may not receive the full data burst.

Enter Menu 16th to set RX.SAV. Default: OFF.

16) Auto Keypad Lock (AUTOLK---MENU 18)

Functions: in order to prevent accidental frequency change or inadvertent transmission, various aspects of the transceiver's keys and switches may be locked out.

Enter Menu 18th to set AUTOLK. Default: OFF.

When you switch AUTOLK ON, the keypad will be locked automatically if there is no key operation for 5 second.

If the radio is locked, press [🔒] key to unlock it. Also you can lock it using [🔒] key by manual.

17) Voice Prompt (VOICE---MENU 19)

Functions: enable/disable voice prompt.

Enter Menu 19th to set VOICE. Default: ON.

18) Power-on Display setting (OPN.SET&VLT&PON.MSG---MENU 20&21&22)

Functions: choose power-on display mode and edit power-on message

Enter Menu 20th to set OPN.SET. Default: OFF.

OFF: display model version

DC: battery power voltage

MSG: power-on message

Enter Menu 21st to check battery voltage.

Enter Menu 22nd to edit power-on message, also you can edit it directly by program software.

Using [⌃] / [⌄] to select character; [⭐] / [#] to switch cursor position.

19) Repeater Shift setting (OFFSET&S-D---MENU 23&28)

Functions: repeater stations, usually located on mountaintops or other high locations, provide a dramatic extension of the communication range for low-powered hand-held or mobile transceivers.

Under VFO mode, you can set the magnitude and direction of the repeater shift.

Enter Menu 23rd to set magnitude of the repeater shift.

Available values: 0.00 ~ 99.95 MHz

Enter Menu 28th to set the repeater shift direction. Default: OFF.

20) Display Channel Name (DIS.NAME&CH.NAME---MENU 23&24)

Functions: switch channel name display ON/OFF and edit channel name under MR/CH
mode.

Enter Menu 23ʳᵈ to switch display channel name ON/OFF.

**Enter Menu 24ᵗʰ to edit channel name, also you can edit it directly by program
software.**

Using [▲] / [▼] to select character; [✱] / [#] to switch cursor position.

21) Tone coder & Tone Search Scanning & Tone calling (C-CDC& R-CDC&
    T-CDC&SEEK 67.0&D023N---MENU 25&26&27&31&32)

Function 1: CTCSS/DCS Operation

Many repeater systems require that a very-low-frequency audio tone be superimposed
on your FM carrier in order to activate the repeater. This helps prevent false activation
of the repeater by radar or spurious signals from other transmitters.

Enter Menu 25ᵗʰ/26ᵗʰ/27ᵗʰ to set TX&RX Tone coder/ RX Tone coder/ TX Tone coder.

1) Press [✱] key to select CTCSS/ DCS/ OFF. After you choose CTCSS/ DCS,
   press [▲] / [▼] key to choose the right group you need.

2) Press [#] key to select DCS direction.

The transceiver has 50 groups CTCSS, 104 groups normal/inverted DCS.

CTCSS TONE FREQUENCY (Hz)					
67.0	69.3	71.9	74.4	77.0	79.7
8.25	85.4	88.5	91.5	94.8	97.4
100.0	103.5	107.2	110.9	114.8	118.8
123.0	127.3	131.8	136.5	141.3	146.2
151.4	156.7	159.8	162.2	165.5	167.9
171.3	173.8	177.3	179.9	183.5	186.2
189.9	192.8	196.6	199.5	203.5	206.5
210.7	218.1	225.7	229.1	233.6	241.8
250.3	254.1	-	-	-	-

DCS CODE						
023	074	172	265	371	503	662
025	114	174	266	411	506	664
026	115	205	271	412	516	703
031	116	212	274	413	523	712
032	122	223	306	423	526	723
036	125	225	311	431	532	731
043	131	226	315	432	546	732
047	132	243	325	445	565	734
050	134	244	331	446	606	743
051	143	245	332	452	612	754
053	145	246	343	454	624	-
054	152	251	346	455	627	-
065	155	252	351	462	631	-
071	156	255	356	464	632	-
072	162	261	364	465	645	-
073	165	263	365	466	654	-

Function 2: TONE Search Scanning

In operating situations where you don't know the CTCSS/DCS tone being used by another station or stations, you can command the radio to listen to the incoming signal and scan in search of the tone being used.

Enter Menu 31st/32nd to start CTCSS/DCS searching.

If the Tone scan feature does not detect a tone or code, it will continue to scan indefinitely. When this happens, it may be that the other station is not sending any tone. You can press **PTT** key to halt the scan at any time.

You also can press **MONI** key during Tone scanning to listen to the (muted) signal from the other station. When you release the **MONI** key, Tone scanning will resume.

Tone Scanning works either in the VFO or MR modes.

Function 3: TONE Calling (1750Hz)

If the repeaters in your country require a 1750Hz burst tone for access (typically in Europe), you can press and hold **CALL** key for 2s and transmitter will automatically be activated, and a 1750Hz audio tone will be superimposed on the carrier. Once access to the repeater has been gained, you may release **CALL** and use **PTT** key for activating the transmitter.

22) VFO Step setting (STEP---MENU 29)

Functions: setting of the synthesizer steps

Enter Menu 29th to set VFO step.

Available Values: 5/6.25/10/12.5/25/50/100 kHz

23) Wide/Narrow band selecting (N/W---MENU 30)

Functions: setting of wide/narrow bandwidth

Enter Menu 30th to set bandwidth.

Available Values: Wide---25kHz/Narrow---12.5kHz

24) Voice Mode and Scrambler (SCR&APRO---MENU 33&34)

Functions: only 2/5 tone version has this function.

The transceiver has 8 groups of scrambler; it is accomplished by the addition of components to the original signal in order to make extraction of the original signal difficult. And its voice compand technology will make the voice more clearly in the noise environment.

Enter Menu 33rd to set scrambler group.

Enter Menu 34th to set voice mode.

Available Values: OFF/COMP/SCRA

ADVANCED FUNCTIONS

1) PTT ID SETTING

PTT ID (Programmed by software)

This transceiver supports two optional signalings, MSK and DTMF. DTMF signaling only supports encoding.

Set transmitting and receiving frequency in advance and then program PTT ID via software, click in sequence: Program → Optional Features → PTT ID setting. And click the ANI (mark √). You can input character in BOT and EOT.
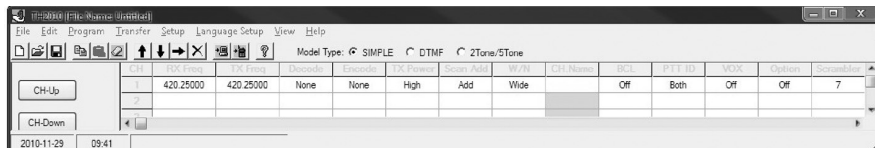
If select MSK, you can choose from 0-9, 4 digits in maximum for BOT; for EOT, you can choose from 0-9 and A-Z, 6 characters in maximum. While select DTMF, for BOT, you can choose from 0 to 9 and A to D, 7 characters in maximum. For EOT, you can choose from 0-9 and A-Z and 7 characters in maximum. You can select "BOT, EOT, or BOTH, then save to the radio.
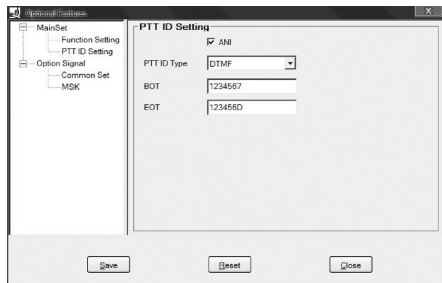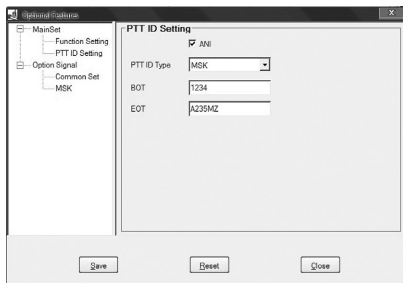
2) EMERGENCY ALERT [🄵] + [🔘]

Under standby mode, press [🄵] to enter menu setting, LCD displays

"**MENU**"; then press [🔘] to turn on emergency alert function, radio

will transmit emergency ring for 20S and then receive for 10S, until you

press PTT, it will exit.

3) KEYPAD LOCK SETTING

Under standby mode, press [🔘] for 2S to lock or unlock the keypad,

" ⊶ " will be displayed at the top of LCD when keypad is locked.

4) REVERSE FREQUENCY ON/OFF

Under standby mode, press [🔘] for 2S to turn on or off this function,

"**R**" will be displayed at the top of LCD when you turn on this function.

At this time, radio's transmitting frequency is its receiving one, and its

receiving frequency is its transmitting one.

5) TONE CALLING (1750Hz TONE)

To access a repeater, press and hold in [CALL] key for the amount of time specified by the repeater. The transmitter will automatically be activated, and a 1750Hz audio tone will be superimposed on the carrier. Once access to the repeater has been gained, you may release [CALL] key and use PTT for activating the transmission.

6) CHANNEL STORAGE AND DELETE

Channel Storage

Under VFO mode, input desired frequency by keypad directly or select one by pressing [▲] or [▼], and then press [F] + [EXIT], the digits blinks at the right top of LCD, press number to input desired channel directly or press [▲] or [▼] to choose desired one, then press [EXIT] for storage.

Note: after you input desired channel number, if it blinks, it means that this channel is already occupied, you can choose another one.

e.g.: to store the frequency: 450.325MHz with CTCSS: 151.4 to the channel 05, the step are as follows:

1) Under VFO mode, input 4-5-0-3-2-5
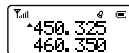
2) Press [**F**] + [**2**][**5**] or press [**F**] + [**★**], then press
   [**F**] to enter
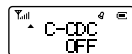
3) Press [**★**] to choose CTCSS mode, LCD displays C-CDC 67.0
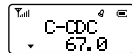
4) Press [**∧**] or [**∨**] to choose 154.1, then press [**F**] to confirm

5) Press [**EXIT**] twice to exit

6) Press [**F**] + [**EXIT**], the digit blinks at the right top of LCD
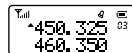
7) Press [**∧**] or [**∨**] to choose or input 05 directly
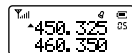
8) Press [**EXIT**] for storage, LCD displays MR mode and currently
   stored channel
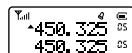
Channel delete

1) Under MR or CH mode, press [**EXIT**] to turn on the radio, LCD
   displays **"DEL ?"** and channel number blinks at the right top of
   LCD.

2) Press [**∧**] or [**∨**] or input channel number you want to
   delete, then press [**F**] to confirm

3) After delete, it will skip into next channel, if you want to delete it,
   repeat above operation.

7) FM RADIO FUNCTION

1) On/off radio receiver

Under standby mode, press [📻] to open FM radio function, LCD
display "**70.00M**", then press [📻] again, radios receiver is off.
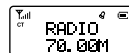
Note: under FM radio mode, if receiving the signal, the radio will be out
of FM mode, after 5S, it will be back to FM mode when the signals
disappear.

2) Mode selection:

Under FM radio mode, press [🔲] to switch between FM memory
mode and FM frequency mode (this function is unavailable when
there is not FM memory channel)

3) Frequency selecting

Under FM frequency mode, input the digits directly by keypad or
press [🔼] or [🔽] to choose the desired frequency. Under FM
memory mode, press [🔼] or [🔽] to choose the desired channel.

4) FM radio search:

Under FM radio mode, press [🇫] + [1⃣], then press [🇫]
again to enter FM radio scanning, you will see "**RADIO SEEK.UP**"
in the screen, press [🔼] or [🔽] to change scanning direction.
Radio will stop scanning when frequency is available and then exits.
If you rotate the encoder knob, it will scan again; press any key

except [▲] or [▼] and [A/B] to exit.

5) FM radio storage

Under FM frequency mode, press [F] and then press[EXIT], the channel number for storage blinks at the right of the screen. press [▲] or [▼] or use number key to select the desired channel number, press [EXIT] to confirm and then back to the receiving mode.

6) FM radio channel delete:

Under FM memory mode, turn off the radio, press [EXIT] to turn on the radio, you will see "**DEL ?**" in the screen and the channel number blinks. press [▲] or [▼] to choose the channel number you want to delete, press [F] to confirm. Repeat this operation, you can delete all memory channel, 25 in maximum.

8) WIRE CLONE

Prepare 2sets of AHT-28-V/AHT-78-U, 1pcs specific wired cloning cable.

Master radio (sending messages when in wired cloning)

Deputy radio (receiving and storing messages when in wired cloning)

Steps of wired clone

1) The deputy radio normally power on. Connect master and deputy one with the wired cloning cable.

2) Press PTT and [▲] to turn on the master radio, enter the wired

clone state. The "Clone" will be heard, LCD displays "**CLONE**"

3) Press [MONI] key of the master radio to start wired clone. During cloning, the master radio displays "**Sending**" and deputy one displays "**End**". If cloning succeeds, the master radio returns to the clone preparation state, and it lights orange. it displays "**Error**". Please check the cloning cable and then press [MONI] to enter cloning state again.

CLONE

SENDING

END

ERROR

OPTIONAL SIGNALINGS
REMOTE KILL, STUN, ACTIVATE AND REVIVE

OPTIONAL SIGNALINGS

Optional Signalings (Programmed by software)

This transceiver supports four optional signalings (MSK, DTMF, 2-Tone, 5-Tone).
Click in sequence "program → Optional Features → Optional Signal → Common Set", the programming software also has three versions: simple version (Supporting MSK Signaling), DTMF version (Supporting MSK signaling and DTMF signaling) and 5T&2T version (Supporting MSK signaling and 2T/5T signaling). Please check the version first before programming. If the version of programming software is different from the radio version, you cannot program via software.

In transmitting, maybe radio cannot receive the complete signaling, because radio needs time to switch when in power-saving state. We have to set the "Digit delay", that's, to send a carrier first, let radio receive signal, then send Signaling to make sure it will be received. The suggested time for delay time is more than 400S

Press [CALL] key, LCD will display "DTMF?", "MSK?" or "2Tone?", Press [0 AM] and [9 BEEP] keys to make call with the desired call list message. If the corresponding call list has not been edited, the function is not available.

DTMF Part

Click in sequence "program•Optional Features•Optional Signal•DTMF"

Step 1: Edit the Fast Call list via programming software, radio can store up to 10 groups
(0-9) last calling list in total

Step 2: Input the desired code into the corresponding list, 16 characters in maximum.

Step 3: Choose the desired DTMF decoder from available values: "Code Squelch (Picture
1) and Selective Call (Picture 2)"

Step 4: Choose the Intermediate Code if you select "Selective Call" (The first three are ID
code and the fourth are Intermediate Code)

Step 5: Choose the group code, then click [save] after finishing it, and then exit.
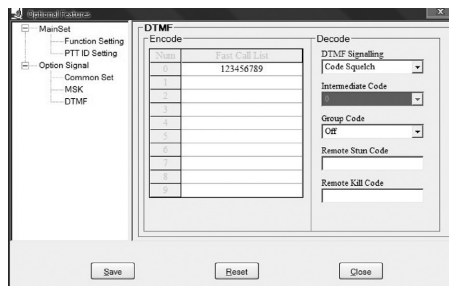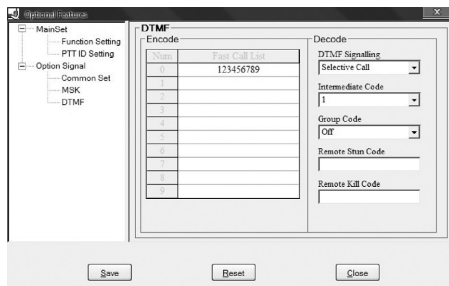
Picture 1   Picture 2

Click "More" after frequency you edit, programming in the popup

Step 6: Set the optional signal of the desired channel to be DTMF. Input the ID code and
then save it after finishing it.

Make DTMF call with the transceiver

First method

1) Power on, then select the channel with DTMF signal

2) Press [CALL] key, LCD displays "**CALL/DTMF?**",

then press [0] – [9] keys to make call with the

desired call list message. If the corresponding call list

has not been edited, it will sound "DU".

```
┌─────────────┐
│ Tull      ◁ ▣ │
│ ^CALL         │
│    DTMF ?     │
└─────────────┘
```

Second method

Press PTT and hold on and then press the number key to transmit.

MSK Part

Edit the MSK message of the transceiver (ID code is for receiving while calling list message
is for transmitting.)

Click in sequence "program→ Optional Features → Optional Signal → MSK"

Step 1: Edit the Fast Call list via programming software, radio can store up to 10 groups
(0-9) last calling list in total

Step 2: Input the desired code into the corresponding list, 4 characters in maximum, Click
[save] after finishing it then exit.

Step 3: Input corresponding ID code in the calling list. ID code should be corresponding to the one in the CallList, e.g.: if ID code is 1234, the corresponding callList is Group 1 (Picture 3)
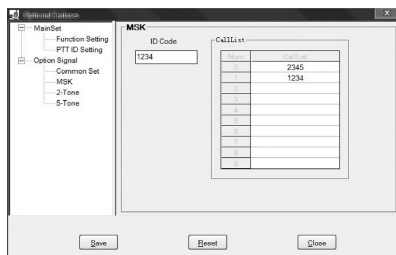
Picture 3

Step 4: Set the optional signal of the desired channel to be MSK. Click "More" after every frequency you edit, program it in the popup (Picture 4)
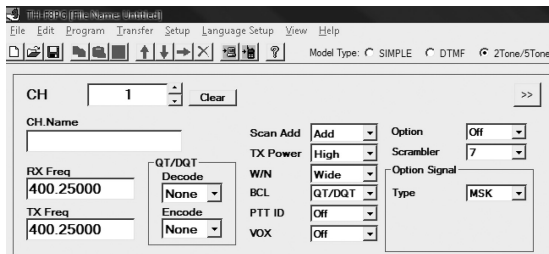
Picture 4

Make MSK call with the transceiver

1) Power on, then select the channel with MSK signal

2) Press [CALL] key, LCD displays "**CALL/DTMF?**",

   then press [0 ANI] – [9 BEEP] keys to make call with the desired

   call list message. If the corresponding call list has not been

   edited, it will sound "DU".

   e.g.: program the above frequency and MSK signal into two radio.

       input ID code 1234 into radio A, and input 2345 into radio

       B. Press [CALL], LCD displays "**CALL/MSK?**",

       then press [0 ANI], you can call B with A. if you want to call

       A with B, press [CALL], LCD displays "**CALL/MSK?**",

       then press [1 SCAN], that is to say, if you want to call one radio,

       just input the ID code of that radio.

2-Tone Part

Edit 2Tone message:

Step 1: Edit the Fast Call list via programming software, radio can store up to 10 groups

       (0-9) last calling list in total

Step 2: Input the encoding-requested A-Tone (the first tone), B-Tone (the second tone)

       and the gap time between A-tone and B-tone, the default setting is 100S

       In encoding, A tone will sound 1S while B Tone will sound 3S. But when there is

       only A tone in the call list as group call tone, A tone will sound 5S. Please refer to

Picture 5 and Picture 6,

Picture 5: 2tone as transmitting encoder
Group 0:2 tone
Group 1: single tone

Picture 6: 2tone as receiving decoder
Group 0:.2 tone decoder
Group 1: single tone decoder

As single tone calling, only input A Tone (e.g. A Tone is 1750 Hz), no need to input in another Tone. The Tone in "Group Call" should be the same to the Tone of encoder (900.3MHz).

Step 3: Set the optional signal of the desired channel to be 2-Tone. Click "More" after every frequency you edit, program it in the popup. (Picture 7/8)

Picture 7: Select group 0 as 2-Tone

Picture 8: Select group 1 as single-tone

Make 2-tone call with the transceiver

1) Power on, then select the channel with 2-Tone signal
2) Press [CALL] key, LCD displays "**CALL/2T?**",
   then press [0 ANI] key to transmit 2-Tone while press [1 SCAN] to
   transmit a single tone/Group call. If the corresponding call list
   has not been edited, it will sound "DU".
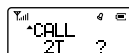
5-Tone Part

Edit 5tone message

Click in sequence "program → Optional Features → Optional Signal → 5-Tone" to program
5-Tone ID and 5-Tone international standard group.
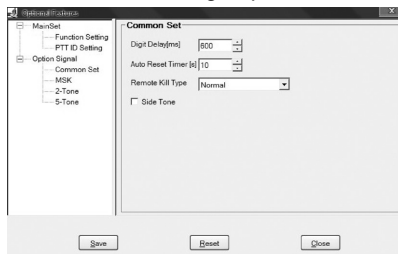
The group numbers 0-9 in the call list is used to edit the 5tone ID of the radio you want to
call. You can put 0-9, A, B, C, D and number (including repeated ID)

The group in the international standard are: CCIR1, CCIR2, CCITT, EEA, EIA, NATEL,
ZVEL1, ZVEL2, 9 groups in total.

Select one of them and input self ID (input in ID), and then write into the radio.

E.g. the self ID is CCIR2, 5tone is 2A358; the ID of other radio is 44044 (group number is 0). As following picture 9:
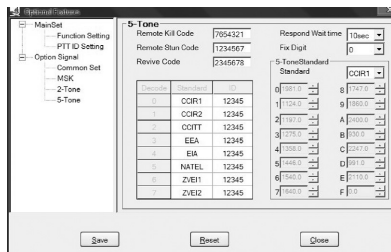
Picture 9

Click "Save" after editing desired 5tone, and then write into the radio

Click "More" after the channel needed editing to enter setting. Select 5tone in the Optional signal, and then select the List Num want to call, and click "ON" in the Auto Response. You also can set the frequency and channel then press "OK" to save the information to the radio (Picture 10)
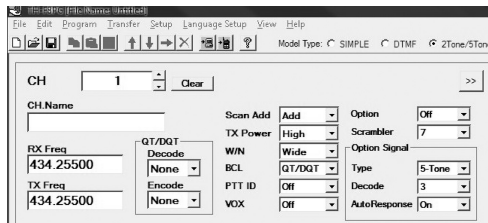
Picture 10

This transceiver has 8 groups' 5-Tone encoder and decoder to support the different channels, the operation of calling/transmitting 5-Tone are as follows:

1) Select the channel with 5-tone signal.

   (LCD displays "5T" at the right bottom of radio)

2) Press [CALL], LCD displays "------"

3) Input the 5-Tone ID of radio you want to call

   e.g.: input A-2-3-5-B in Group 2 in sequence, at this time the

   keys [▲], [▼], [RANGE], [EXIT] stand for "A", "B", "C",

   and "D", so if you want to input A-2-3-5-B, press [▲],

   [2 PRI], [3 VOX], [5 SQL] [▼], in sequence

4) Press PTT to transmit

REMOTE KILL, STUN, ACTIVATE AND REVIVE

If you want to use remote kill, stun, activate and revive, please program signalling for current channel as DTMF and 2/5tone.

REMOTE KILL: If the radio received DTMF code programmed as remote kill, the radio will enter the remote kill status; radio cannot send or receive signals. If the radio received DTMF code programmed as revive, the radio will quit the remote kill status and enter normal operation. In this situation, the radio only can be revived by programming software, the method is as follows: read data from radio first and then click program → Optional Features → Optional Signal → Common Set, and select "Normal" in the "Remote Kill Type", then save the data to the radio.
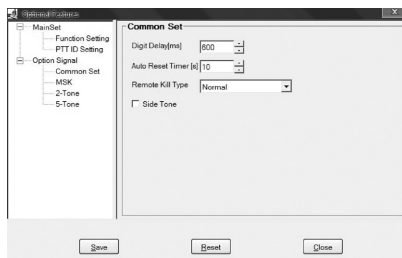
REMOTE STUN: If the radio received DTMF code programmed as remote stun, the radio will enter the remote stun status; radio can only receive signals and cannot send signals. If the radio received DTMF code programmed as

remote un-stun, the radio will quit the remote stun status and enter normal operation.

1) Simple version don't have this function

2) DTMF version

A. Click in sequence "program → Optional Features → Optional Signal → DTMF → Remote kill/stun code" to input your desired Remote kill/stun code
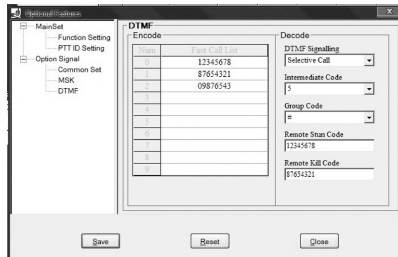
B. In transmitting, input the Remote kill/stun code for the radio which you want to remote kill/stun.

C. Remote revive code is "remote stun code + #", but the remote kill one aren't able to be revived by this way.

e.g.: There are two radios with the same DTMF encode. The remote stun code for radio A is 12345678, remote kill one is 87654321. If you want to remote un-stun it, please use another radio to input the working frequency of radio A, press [PTT] to transmit, at the same time to input remote stun code 12345678. After receiving this

code, the radio will enter the remote stun status and you will hear a sound. And then press [PTT] and input DTMF code 12345678#, the radio will quit the remote stun status and enter normal operation. The operation of remote kill is the same to remote stun, but in this situation, radio cannot be revived by this way.

3) 5T&2T Version

A. Click in sequence "program → Optional Features → Optional Signal → 5-Tone → Remote kill/stun code" to input your desired Remote kill/stun code, the fixed one is 7 characters.
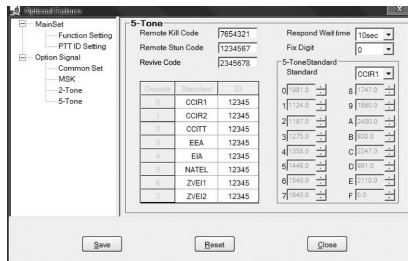
B. press [CALL], LCD displays '------', input the code directly and then press [PTT] to transmit.

e.g.: the Remote stun code for radio A is 1234567, revive code is 2345678, remote kill one is 7654321. If you want to remote stun it, please use another one, radio B to input the working frequency of radio A, then press [CALL], LCD displays "-----", input in sequence 1234567, then press [PTT] to transmit. After receiving this code, the radio A will enter the remote stun status and you will hear a sound. If you want to

revive it, press [CALL] and input remote un-stun code 2345678, the radio will quit the remote stun status and enter normal operation. The operation of remote kill is the same to remote stun.

TECHNICAL PARAMETERS

TECHNICAL PARAMETERS

General

Frequency Range	VHF 136~174MHz 245~246MHz
	UHF 400~470MHz 350~390MHz
	465~520MHz
Channel No.	2x128
Frequency stability	±2.5PPm
Antenna	High gain antenna
Antenna Impedance	50 Ω
Operating Voltage	DC7.2V (Rechargeable Li-ion battery)
Mode of operation	Simple or semi-duplex
Dimensions (WxHxD)	58 x 110 x 32mm

Transmitter

Output power	VHF: 5W / 1W UHF:4W / 0.5W
Modulation Mode	16kΦF3E / 11kΦF3E
Maximum deviation	≦ 5kHz / ≦ 2.5kHz
Spurious Radiation	≦ 7.5μW
Adjacent Ch. power	≦ −65dB /≦ −60dB
Pre-emphasis characteristics	6dB
Current	≦ 1.6A(5W)
CTCSS/DCS deviation	0.5kHz±0.1kHz / 0.4kHz±0.1kHz
Intermediation sensitivity	8-12mv
Intermediation distortion	<5%

Receiver

RF Sensitivity	-122dBm(12dB SINAD)
Audio power	1W
Audio Distortion	<10%
Intermediation	≧ 60dB ≧ 55dB
Selectivity	≧ 65dB ≧ 60dB
Spurious Rejection	≧ 65dB
Blocking	≧ 85dB

Note: Specification will be revised without notice due to technical improvement. Thank you.